Space Weather Forecast

Issued on Friday 3 January 2025 at 13:29 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares likely, with a slight chance of Strong class flares. Chance G1 Minor Storms on Day 2 (04 Jan).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High, with a low-level Strong flare observed from a sunspot region in the far northeast disc at 03/1139 UTC.

There are fifteen sunspot regions on the Earth-facing disc. The region located in the far northeast, responsible for the recent Strong flare, underwent growth in its leading and trailing regions. A smaller region, in the southwest, responsible for a low-level Moderate flare at 02/1740 UTC, exhibited decay in its trailing spots. Two moderately sized regions, located in south-centre and southeast disc respectively underwent slight decay and simplification in their magnetic configurations. A number of small regions emerged on the facing-disc.

No Earth directed Coronal Mass Ejections (CMEs) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Observed solar winds showed ongoing but waning CME influence. Wind speeds have shown a steady decline elevated to slightly elevated from 530km/s to 410km/s in the period. Interplanetary Magnetic Field, has been largely moderate, but has been fluctuating around the strong threshold since 03/0410 UTC. The north-south component, was initially weakly to moderately negative (southward), before becoming persistently weak to moderately positive (northward) from around 02/1720 UTC.

Geomagnetic activity was initially Active, between 02/1200-1800 UTC, but has since been at Quiet to Unsettled levels.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no Solar Radiation Storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High, with isolated Moderate-class flares considered likely and a slight chance of further isolated Strong-flares.

Solar Wind / Geomagnetic Activity: There is one potential Earth directed CME, which is expected to pass near Earth early on Day 2 (04 Jan), but with low confidence. Solar winds are currently

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slightly elevated but continuing to ease following the influence of the two CME arrivals on 31 Dec and 01 Jan. A connection to fast winds from a coronal hole may then give elevated wind speeds on Days 2-3.

Geomagnetic activity is expected to be Quiet to Unsettled initially, with a chance of isolated Active intervals on Day 1 (03 Dec). Between Day 2 and Day 3 (04 and 05 Jan) activity is expected to increase to Unsettled to Active levels, due to CME and/or coronal hole enhancements. There is a high chance of peak G1/Minor Storm conditions and slight chance of G2/Moderate Storm levels occurring. Activity is forecast to subside to Quiet to Unsettled levels on Day 4 (06 Jan).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to continue at background levels, but with a slight chance of exceeding the S1/Minor Storm threshold.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	5	40	20	5
Strong	**G3**	No	1	5	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 (M Class)**	Yes	60	60	60	60
Very Active	**R3-R5 (X Class)**	Yes	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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